Age of Prehistoric Animals

Coelurosaurs

- INFRAORDER COELUROSAURIA

- Traditionally, the carnivorous thero' pods are further subdivided (into infra' orders) according to their size. There were large, massively built predators called carnosaurs (see pp. 114-121). There were mediunvsized carnivores called deinonychosaurs, with a kill' ing claw on each hind foot (see pp. 110-113). And there were small, lightweight hunters called coelurosaurs (below). Their name means “hollow' tailed lizards,” and refers to the thim walled, hollow bones that made up not only their tails, but most of their delicately built bodies.

FAMILY PODOKESAURIDAE

- Procompsognathus triassicus
- Saltopus elginensis
- Coelophysis bauri

FAMILY COELURIDAE

- Coelurus fragilis
- Moros intrepidus

FAMILY COMPSOGNATHIDAE

- Compsognathus longipes

FAMILY ORNITHOMIMIDAE

- Elaphrosaurus bambergi
- Dromiceiomimus samueli
- Ornithomimus velox
- Struthiomimus altus
- Gallimimus bullatus

FAMILY OVIRAPTORIDAE

- Oviraptor philoceratops
- Avimimus nemegtensis

FAMILY THERIZINOSAURIDAE

- Therizinosaurus cheloniformis

FAMILY DROMAEOSAURIDAE

- Dakotaraptor steini
- Deinonychus antirrhopus
- Velociraptor osmolskae

FAMILY SAURORNITHOIDIDAE

- Saurornithoides mongoliensis
- Troodon formosus

FAMILY AVES

- Archaeopteryx lithographica

Carnosaurs

- INFRAORDER CARNOSAURIA

- Some of the largest terrestrial carnivores that have ever existed belong to this group of theropod dinosaurs — the carnosaurs or “flesh lizards.” Tyrannosaurus is the most familiar member of the group. They were massively built animals, and dominated life in Jurassic and Cretaceous times.

- Their efficiency as predators is, how¬ ever, debatable. In reality, the largest of them, such as Tyrannosaurus and Tarbosaurus, could have been part-time scavengers. They may have been the “hyenas” of the dinosaur world rather than the “lions.” Their sheer bulk would, most likely, have precluded any sustained chase. But they could have ambushed prey, and attacked in short bursts of speed, like a modern tiger.

- There were also other smaller carnosaurs, lighter and more agile than their giant contemporaries.

FAMILY MEGALOSAURIDAE

- Giganotosaurus carolinii
- Proceratosaurus bradleyi
- Dilophosaurus wetherilli
- Eustreptospondylus oxoniensis

FAMILY ALLOSAURIDAE

- Allosaurus europaeus
- Yangchuanosaurus zigongensis

FAMILY CERATOSAURIDAE

- Ceratosaurus nasicornis

FAMILY SPINOSAURIDAE

- Acrocanthosaurus atokensis
- Spinosaurus aegyptiacus

FAMILY TYRANNOSAURIDAE

- Alioramus altai
- Daspletosaurus horneri
- Tarbosaurus bataar
- Tyrannosaurus rex

Prosauropods

- INFRAORDER PROSAUROPODA

- Like the theropods, the sauropodomorphs can be grouped according to their size. There were gigantic types, with long necks and tails, placed in the Infraorder Sauropoda (see pp. 126-1 33). Apatosaurus (previously known as Brontosaurus) is the most famous sauropod (see p. 132). These gentle, plant¬ eating giants lived throughout the Jur¬ assic and Cretaceous periods, and then met a similar fate to all other dinosaurs — mass-extinction.

- There were also smaller sauropodo¬ morphs (though some were still fairly large, at over 30 ft/9 m), which are grouped in the Infraorder Prosauropoda. As their name implies, they were Lbefore the sauropods," and lived dur¬ ing Late Triassic times. Current theory rejects the once-held notion that the prosauropods were the direct ancestors of the sauropods. They are now regard¬ ed as a side branch of the sauropod family tree — a branch that got fatally pruned in the Early Jurassic period (see pp. 90-93).

- Prosauropods themselves are thought to have evolved from theropod-type ancestors. The remains of 2 likely candi¬ dates have been found, both from South America. Staurikosaurus is the only known dinosaur from the Mid-Triassic period, and was about 6 ft 6 in/2 m long; Herrerasaurus, from the Late Triassic, was 10 ft/3 m long. Both seem to have been active, 2-legged flesh-eaters, with large heads and long tails.

FAMILY ANCHISAURIDAE

- Anchisaurus polyzelus
- Thecodontosaurus antiquus

FAMILY PLATEOSAURIDAE

- Massospondylus kaalae
- Plateosaurus gracilis
- Mussaurus patagonicus

FAMILY MELANOROSAURIDAE

- Riojasaurus incertus

Sauropods

- INFRAORDER SAUROPODA

- Between 65 and 200 million years ago, the largest herbivores — in fact, the largest land animals ever to have lived — were the giant, long-necked, 4-legged sauropods. As a group, they survived for some 50 million years. They evolved in the Late Triassic or Early Jurassic, reached their peak in the Late Jurassic, and became extinct by the end of the Cretaceous. Even in the early stages of their evolution, most sauropods were huge — well over 50 ft/15.2 m long.

- The body plan of all sauropods was structurally similar. There was a small head on top of an extra-long neck; a long, deep body to accommodate an enormous gut; thick, pillarlike legs with 5-toed, spreading feet; and a long, thick tail tapering to a whiplash.

- Two special adaptations of the skele¬ ton were evident, even in the earliest sauropods. First, great cavities were hol¬ lowed out of the vertebrae; this helped to lighten the load of the animal con¬ siderably, while still retaining the struc¬ tural strength of its skeleton. This hollowing-out became more extreme as the sauropods evolved. Bone was devel¬ oped only along the lines of stress (com¬ parable to the steel struts in a crane jib).

- The second special feature was that the massive hip girdle was firmly fused to the backbone by 4 (and in later types, .5) sacral vertebrae, and formed a solid support for the heavy body and tail.

FAMILY CETIOSAURIDAE

- Cetiosaurus oxoniensis
- Barapasaurus tagorei

FAMILY BRACHIOSAURIDAE

- Brachiosaurus altithorax
- Sauroposeidon proteles

FAMILY CAMARASAURIDAE

- Camarasaurus supremus
- Euhelopus zdanskyi
- Opisthocoelicaudia skarzynskii

FAMILY DIPLODOCIDAE

- Diplodocus hallorum
- Apatosaurus ajax
- Mamenchisaurus sinocanadorum
- Supersaurus vivianae

FAMILY TITANOSAURIDAE

- Dreadnoughtus schrani
- Patagotitan mayorum
- Saltasaurus loricatus

Ornithopods

- SUBORDER ORNITHOPODA

- Members of the great reptilian order of “bird-hipped” dinosaurs, the Ornithischia, were exclusively plant-eaters* The other great order of dinosaurs, the Saurischia, had both carnivorous and herbivorous members (see pp. 106-1 33).

- The cheek teeth of most ornithischian dinosaurs were set slightly in from the edges of the jaws. The space lateral to the teeth was probably enclosed by fleshy cheeks. (Evidence for these is seen in the slight depressions on either side of the skull in the cheek area.) The cheeks would have prevented food from falling out of the sides of the mouth while the plant-eater was engaged in the lengthy process of chewing up the material.

- These cheeks were a useful develop¬ ment for herbivores, and may have been the reason for the great success of the small to medium-sized (up to 33 ft/10 m long) plant-eating dinosaurs of the Jur¬ assic and Cretaceous periods. Linked to this success was the extinction of their early, cheekless rivals, the prosauropod saurischians of the Triassic period (see pp. 122-125).

- Ornithischian dinosaurs can be div¬ ided into 4 distinct suborders, 3 of which consist of 4degged creatures that were armed in one way or another. The stegosaurs had great bony plates down their backs (see pp. 154—156). The ankylosaurs had armor-plated skins and “clubs” at the end of their tails (see pp. 157-161). And the ceratopians had horns on their heads and bony neck frills (see pp. 162-169)._

- The fourth suborder consists of the ornithopods, or “bird feet” (below). They walked on 2 legs, and could have been the ancestral group from which the other ornithischian dinosaurs evolved. They were a mixed assemblage of animals in terms of their size, habits and distribution, but structurally, they were all similar. They were also a highly successful group, which survived for 148 million years, spanning the whole of the Jurassic and Cretaceous periods.

FAMILY FABROSAURIDAE

- Fabrosaurus australis
- Scutellosaurus lawleri

FAMILY HETERODONTOSAURIDAE

- Heterodontosaurus tucki

FAMILY PACHYCEPHALOSAURIDAE

- Alaskacephale gangloffi
- Tylocephale gilmorei
- Stegoceras validum
- Pachycephalosaurus wyomingensis
- Homalocephale calathocercos

FAMILY HYPSILOPHODONTIDAE

- Dryosaurus elderae
- Hypsilophodon foxii
- Nanosaurus agilis
- Thescelosaurus edmontonensis
- Parksosaurus warreni

FAMILY IGUANODONTIDAE

- Iguanodon bernissartensis
- Camptosaurus dispar
- Muttaburrasaurus langdoni
- Ouranosaurus nigeriensis

FAMILY HADROSAURIDAE

- Brachylophosaurus canadensis
- Edmontosaurus regalis
- Saurolophus angustirostris
- Maiasaura peeblesorum
- Shantungosaurus giganteus
- Corythosaurus casuarius
- Lambeosaurus magnicristatus
- Parasaurolophus walkeri
- Olorotitan arharensis

Stegosaurs

- SUBORDER STEGOSAURIA

- The stegosaurs were a distinctive group of ornithischian, or “bird-hipped,” dinosaurs. Their small-headed, massive bodies were characterized by double rows of great, bony plates that extended down either side of the backbone. Their heavy tails were armed with pairs of long, sharp spikes.

- Like their ornithopod relatives, such as the iguanodonts (see pp. 142—145) and the duckbills (see pp. 146-153) y the stegosaurs were plant-eaters, and prob¬ ably lived in herds. But unlike the more agile ornithopods, they were not cap¬ able of running on 2 legs to escape predators. Stegosaurs moved about ex¬ clusively on 4 legs. When attacked, they would most likely have stood their ground, lashing out with the spiked tail, and protected to a certain extent by the bony plates on the back.

FAMILY STEGOSAURIDAE

- Kentrosaurus aethiopicus
- Stegosaurus stenops

FAMILY SCELIDOSAURIDAE

- Scelidosaurus harrisonii

Ankylosaurs

- SUBORDER ANKYLOSAURIA

- The decline of the stegosaurs toward the end of the Jurassic period may be linked to the rise of another group of armored dinosaurs, the ankylosaurs. They spread throughout the northern conti¬ nents during Cretaceous times, and were particularly abundant in Asiamerica toward the end of that period (see pp. 10-11).

- Like the stegosaurs, ankylosaurs were heavily built, 4"legged plant-eaters. They were also armored, but with a different, and more effective, kind of defensive plating than that of the stego¬ saurs. The neck, back, flanks and tail were entirely covered in a mosaic of flat, bony plates, which were embedded in the thick, leathery skin, and covered in horn. Spikes and knobs of various sizes studded the bony armor.

- There were 2 distinct families of ankylosaur. The nodosaurs had narrow skulls, armored backs and long spikes projecting from their flanks (below and pp. 158, 160). The ankylosaurs them¬ selves had broad skulls and a heavy “club” of solid bone at the end of their tails (see pp. 159, 161). A third family, the scelidosaurs (below), are thought to be primitive representatives of the group.

FAMILY NODOSAURIDAE

- Hylaeosaurus armatus
- Sauropelta edwardsorum
- Panoplosaurus mirus

FAMILY ANKYLOSAURIDAE

- Ankylosaurus magniventris
- Euoplocephalus tutus
- Tarchia tumanovae
- Saichania chulsanensis

Ceratopsians

- SUBORDER CERATOPIA

- The horned ceratopians were the last group of ornithischian, or “bird¬ hipped,” dinosaurs to evolve before the whole assemblage of these ruling rep¬ tiles suffered mass-extinction at the end of the Mesozoic Era.

- The ceratopians (often incorrectly called ceratopsians) evolved late in the Cretaceous period. As a group, they existed for a mere 20 million years before becoming extinct, but in that short time, geologically speaking, they established themselves all over western North America and central Asia.

- They were well-armored dinosaurs, although their weaponry was confined to the head, unlike the heavy armor plating that covered the backs of the ankylosaurs (see pp. 157-161). The ad¬ vanced ceratopians had massive heads, armed with a sharp, parrotlike beak at the front; long, pointed horns on the brow or snout, sometimes both; and a great sheet of bone, the “frill,” that grew from the back of the skull and curved upward, to protect the neck and often the shoulders, too.

- The success of the ceratopians can be related to their efficient chopping teeth and powerful jaws. These dinosaurs could have eaten the toughest of plant foods, including a relatively new source — the shrubby flowering plants, similar to magnolia — that had begun to thrive worldwide in Late Cretaceous times. Ceratopians probably lived in herds in the upland forests, browsing on lowgrowing trees and ground vegetation.

FAMILY PSITTACOSAURIDAE

- Psittacosaurus xinjiangensis

FAMILY PROTOCERATOPIDAE

- Protoceratops hellenikorhinus
- Microceratus gobiensis
- Bagaceratops rozhdestvenskyi
- Leptoceratops gracilis
- Montanoceratops cerorhynchus

FAMILY CERATOPIDAE

- Centrosaurus apertus
- Pachyrhinosaurus lakustai
- Styracosaurus albertensis
- Nasutoceratops titusi
- Triceratops horridus
- Torosaurus latus
- Chasmosaurus belli
- Arrhinoceratops brachyops

Pterosaurs

- ORDER PTEROSAURIA

- The first group of vertebrates to take to the air as a way of life were the pterosaurs. These flying reptiles flew on “wings” made of skin, which were at¬ tached along the length of the greatly elongated, fourth fingers of each hand, and rejoined the body at thigh-level.

- These flying reptiles evolved in Late Triassic times, some 70 million years before the first-known bird, Archaeo¬ pteryx , appeared (see p. 176). They thrived throughout the Jurassic and early part of the Cretaceous, diversify¬ ing into many forms, among them the largest flying creatures of all time. Then the group began to decline, its last mem¬ bers becoming extinct at the end of the Mesozoic Era. Pterosaur remains have been found all over the world, except in Antarctica, mostly in marine deposits.

- There are 2 suborders of pterosaur (below). The earliest and most primitive types are the rhamphorhynchs; the later types include the more familiar flying reptiles — the pterodactyls.

SUBORDER RHAMPHORHYNCHOIDEA

- Eudimorphodon ranzii
- Bergamodactylus wildi
- Dearc sgiathanach
- Scaphognathus crassirostris
- Rhamphorhynchus muensteri
- Anurognathus ammoni

SUBORDER PTERODACTYLOIDEA

- Pterodactylus antiquus
- Ctenochasma taqueti
- Cearadactylus atrox
- Arthurdactylus conandoylei
- Pteranodon longiceps
- Quetzalcoatlus lawsoni